

## **APPENDIX C**

### **Field Forms**

- C-1. Groundwater Purge Log**
- C-2. Vapor Purge Log**
- C-3. Kirtland AFB, BFF Spill, Monthly Water Level Field Measurements Form**
- C-4. Visual Classification of Soils Form**
- C-5. Monitoring Well Completion Diagram**
- C-6. Soil Vapor Monitoring Well Construction Diagram**
- C-7. Well Development Record**
- C-8. Well Abandonment Form**
- C-9. Example Completed Chain-of-Custody Form**
- C-10. Sample Collection Log**

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## Form C-2. Vapor Purge Log



Shaw Environmental, Inc.

## VAPOR PURGE LOG

Kirtland Air Force Base, Bulk Fuels Facility Spill

Project Name: \_\_\_\_\_

Well ID No/Interval: \_\_\_\_\_

Field Crew: \_\_\_\_\_

Site / SWMU No.: \_\_\_\_\_

Date: \_\_\_\_\_

Crew Signature: \_\_\_\_\_

Weather: \_\_\_\_\_

Time: \_\_\_\_\_

Review Signature and Date: \_\_\_\_\_

## WELL OBSERVATIONS

Protective Casing / Vault: Intact - Damaged

Locked: Yes - No

Well ID Mark: Yes - No

Notes: \_\_\_\_\_

## CALCULATIONS

(A) Depth to Well Bottom	ft	(F) Filter Pack Length (E - D)	ft
(B) Casing Factor: $\frac{1}{2}'' = .00136$ , $\frac{3}{4}'' = .00306$ , $2'' = .0218$ , $3'' = .04906$	ft <sup>2</sup>	(G) Casing/Borehole Factor: .545 sq. ft ( 10" Casing at 30% porosity)	0.1635 ft <sup>2</sup>
(C) One Well Casing Volume (A x B):	ft <sup>3</sup>	(J) Filter Pack Volume (F x G)	ft <sup>3</sup>
(D) Depth to Top of Screen	ft	(K) One Purge Volume (C + J)	ft <sup>3</sup>
(E) Depth to Bottom of Screen	ft	(L) 10 Purge Volumes (K*10)	ft <sup>3</sup>

Static Pressure: \_\_\_\_\_

Purge Flow Rate: \_\_\_\_\_

## PURGE DATA

Date/Time	Volume Purged (ft <sup>3</sup> )	Horiba Mexa - 584 L				Comments
		CO (%)	CO <sub>2</sub> (%)	O <sub>2</sub> (%)	HC (ppmv)	

Values Prior to Sampling

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Sample ID: \_\_\_\_\_

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## KIRTLAND AIR FORCE BASE, BULK FUELS FACILITY SPILL, MONTHLY WATER LEVEL FIELD MEASUREMENTS

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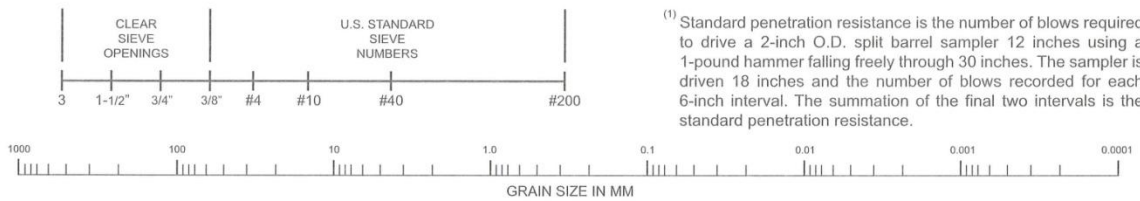
**Form C-4. Visual Classification of Soils Form (concluded)**

Consistency of Cohesive Soils

Consistency	Unconfined Compressive Strength (Tons per Square Foot)
Very Soft	Less than 0.25
Soft	0.25 to 0.50
Firm	0.50 to 2.0
Hard	2.0 to 4.0
Very Hard	More than 4.0

Density of Granular Soils

Density	Standard Penetration Resistance <sup>(1)</sup>
Very Loose	0-4
Loose	5-10
Medium Dense	11-30
Dense	31-50
Very Dense	Over 50



Cobbles	Gravel		Sand			Silt and Clay
	Coarse	Fine	Coarse	Medium	Fine	

USCS CLASSIFICATION FOR SOILS

Coarse-Grained Soils

Clean Gravels (little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
	GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
Gravel with Fines (appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures
	GC	Clayey gravels, gravel-sand-clay mixtures
Clean Sands (little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines
	SP	Poorly-graded sands, gravelly sands, little or no fines
Sands with Fines (appreciable amount of fines)	SM	Silty sands, sand-silt mixtures
	SC	Clayey sands, sand-silt mixtures

Fine-Grained/Highly Organic Soils

Silts and Clays Liquid Limit (less than 50)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	OL	Organic silts and organic silty clays of low plasticity
Silts and Clays Liquid Limit (greater than 50)	MH	Inorganic silts, micaceous or diatomaceous; fine, sandy or silty soils
	CH	Inorganic clays or high plasticity, fat clays
	OH	Organic clays of medium to high plasticity, organic silts
Highly Organic Soils	PT	Peat, humus, swamp soils with high organic contents

Form Number: 252\_2  
Rev. 05-12-09

## Form C-5. Monitoring Well Completion Diagram

## Monitoring Well Completion Diagram KAFB-\_\_\_\_\_

Installation Start Date/Time: \_\_\_\_\_  
 Installation End Date/Time: \_\_\_\_\_

9"x5' Steel Protective Casing with Hinged Cover  
 Combination Lock  
 Concrete Filled Bollard  
 3'x3' Concrete Well Pad  
 Ground Surface

Protective Cover Elevation \_\_\_\_\_ (AMSL)  
 Top of Casing Elevation \_\_\_\_\_ (AMSL)  
 Ground Surface Elevation \_\_\_\_\_ (AMSL)  
 Cement Seal  
 Top of Bentonite Grout ft BGS \_\_\_\_\_ (ft)

11-3/4" Borehole  
 \_\_\_\_\_ feet BGS

9-5/8" Borehole  
 5" Schedule 80 PVC Riser Monoflex Flush Thread  
 PVC Centralizers

High Solids Bentonite Grout 9.4 lb/gal.  
 Calculated: \_\_\_\_\_  
 Actual: \_\_\_\_\_  
 Baroid QuikGrout Type \_\_\_\_\_

Water Level Post Completion ft BGS \_\_\_\_\_ (ft)  
 Water Level Encountered During Drilling feet ft BGS \_\_\_\_\_ (ft)

3/8" Bentonite Chips  
 Calculated: \_\_\_\_\_  
 Actual: \_\_\_\_\_

20/40 Colorado Silica Sand  
 Calculated: \_\_\_\_\_  
 Actual: \_\_\_\_\_

10/20 Colorado Silica Sand  
 Calculated: \_\_\_\_\_  
 Actual: \_\_\_\_\_

Schedule 80 PVC \_\_\_\_\_ feet (0.010" Slot Screen)  
 Schedule 80 PVC 5-foot Sump

Top of Seal ft BGS \_\_\_\_\_ (ft)  
 Top of 20/40 Sand ft BGS \_\_\_\_\_ (ft)  
 Top of 10/20 Sand ft BGS \_\_\_\_\_ (ft)  
 Top of Screen ft BGS \_\_\_\_\_ (ft)  
 Bottom of Screen ft BGS \_\_\_\_\_ (ft)  
 Bottom of Sump ft BGS \_\_\_\_\_ (ft)  
 Bottom of Hole ft BGS \_\_\_\_\_ (ft)

(4,816.90) = Elevations are NAVD 88 Datum values based on NGS Control Station "Hanger", Elevation = 5,343.43 ft. GPS/RTK methods and GEO1D99 model were used to determine elevations of all surveyed points.

Not to Scale  
 BGS = Below Ground Surface

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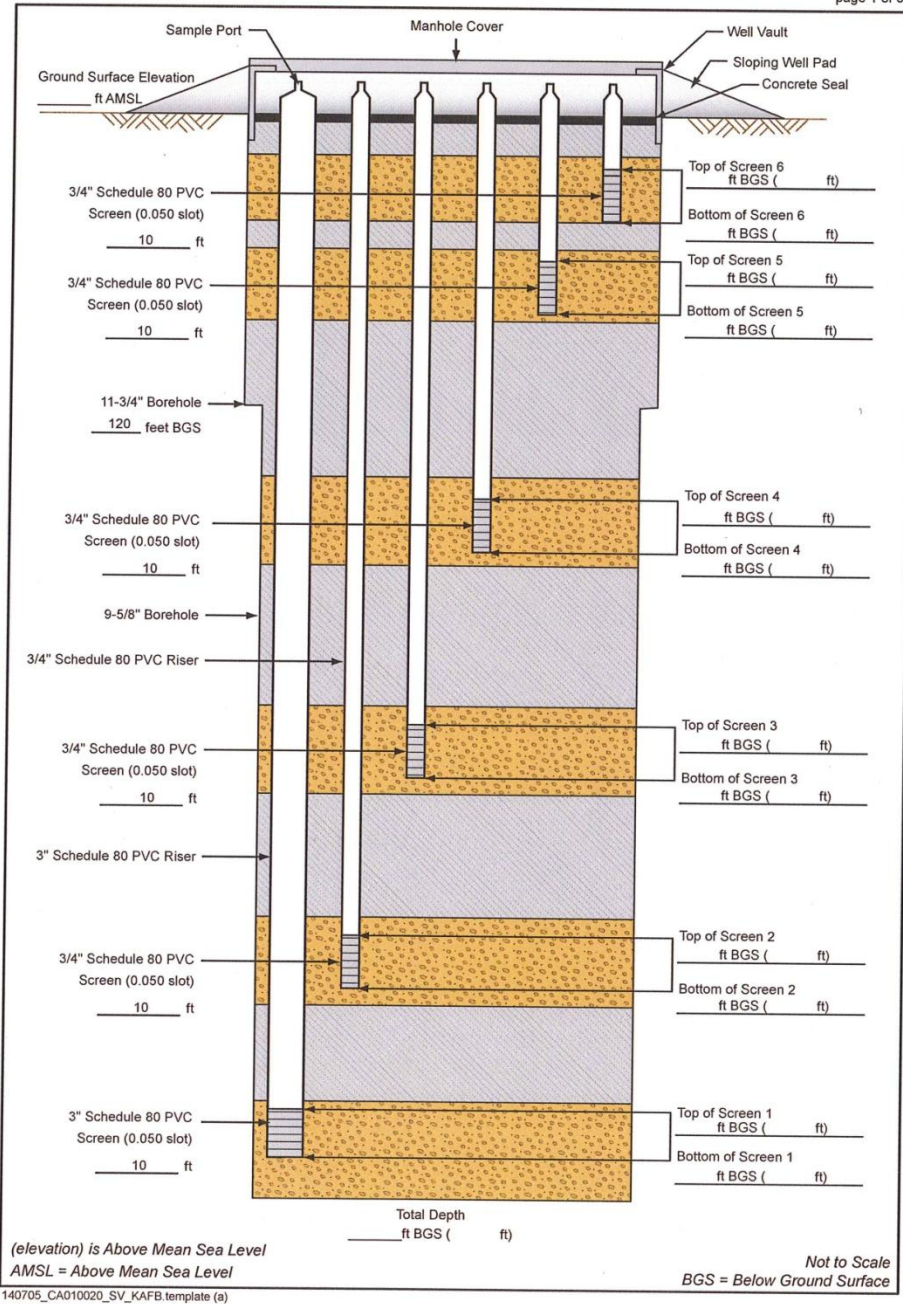
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## Form C-6. Soil Vapor Monitoring Well Construction Diagram

### Nested Soil Vapor Well Completion Diagram for KAFB-

Installation Start Date/Time: \_\_\_\_\_  
 Installation End Date/Time: \_\_\_\_\_

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Pg 1 of \_\_\_\_\_

Well/Piez. No.: \_\_\_\_\_

Date Installed: \_\_\_\_\_

Csq. Diameter (I.D.):

Total Depth (ft. BGL): \_\_\_\_\_

Total Depth (ft. BGL): \_\_\_\_\_

☐ Surgery

 Building

 Pumpkin

☐ Other (State Method)

☐ Criminal Development

☐ Redeployment

Development Date: \_\_\_\_\_

Depth to Water Before Developing Well: \_\_\_\_\_

Vol. (V)	Purge Factor	Volume to Purge
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Height of Water Column: \_\_\_\_\_ feet = \_\_\_\_\_ gal.\* \_\_\_\_\_ = \_\_\_\_\_

$$V = (B * r_c^2 * L_c * 7.48) + (B * (r_w - r_c)^2 * L_s * \phi_s * 7.48) =$$
 gallons

Depth Purging From: \_\_\_\_\_ feet      Time Purging Begins: \_\_\_\_\_

Weather: \_\_\_\_\_ Screened Interval (ft BGL): \_\_\_\_\_

Equipment Nos.: pH Meter: \_\_\_\_\_ EC Meter: \_\_\_\_\_ Turbidity Meter: \_\_\_\_\_

Equipment Decontaminated Prior to Development: Y \_\_\_\_\_ N \_\_\_\_\_

**Describe:** \_\_\_\_\_

Collected Sample of Water Added to Well: Y\_\_\_\_\_ N\_\_\_\_\_

Describe: \_\_\_\_\_

Notes:

\* Water Levels - Reported to the nearest 0.01 foot

\* pH - Reading rounded to 0.1 pH units

\* Water temperature - Reported to nearest 0.1C

\* Turbidity report in NTV nearest whole #

Where:

 $B=3.14$  $\phi_s$  = porosity of the sand pack

$r_c$  = radius of the well casing and screen in feet

$L_c$  = length of water column inside the casing and screen in feet

$r_w$  = radius of the well bore in feet

$L_s$  = length of saturated portion of the sand pack in feet

7.48 gallons/cubic foot= conversion from cubic feet to gallons







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## Form C-9. Example Completed Chain-of-Custody Form



# ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 140705-IDW032

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Project Number: 140705

Samples Shipment Date: 24 MAR 2011

Bill To: Shaw Environmental, Inc. - Accounts P

Project Name: Kirtland AFB

Lab Destination: Hall Environmental Analysis Laboratory

PO Box 98519

Baton Rouge

LA 70884

Sample Coordinator: Mark Lyon

Lab Contact: Andy Freeman

Report To: Pamela Moss

Turnaround Time: 10 day

Project Contact: Pamela Moss

7604 Technology Way, Suite 300

Carrier/Waybill No.: Courier/N/A

Denver

CO 80237

Special Instructions: 10 day TAT

## Possible Hazard Identification:

Non-hazard ☐Flammable ☐Skin Irritant ☐Poison B ☐Unknown ☐Radiological ☐

## Sample Disposal:

Return to Client ☐Disposal by Lab ☐Archive ☐

(mos.)

1. Relinquished By *Kimberly Jones*  
(Signature/Affiliation)

Date: 3/24/11

Time: 1514

1. Received By *Michael Barr*  
(Signature/Affiliation)

Date: 3/24/11

Time: 1514

2. Relinquished By  
(Signature/Affiliation)

Date:

Time:

2. Received By  
(Signature/Affiliation)

Date: 3/24/11

Time: 1540

3. Relinquished By  
(Signature/Affiliation)

Date:

Time:

3. Received By  
(Signature/Affiliation)

Date:

Time:

Comments: 3 Rolloffs

1103932

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	File	CID	Condition On Receipt
✓ 106047IDW2	KAFB10647-SO-106047IDW2-REG	24 MAR 2011	14:16	8 oz CWM	1	None except cool to 4 C	TCLP Metals by SW846 1311 6010B, TCLP Mercury by SW846 1311 7470A				N	
✓ 106047IDW2	KAFB10647-SO-106047IDW2-REG	24 MAR 2011	14:16	8 oz CWM	1	None except cool to 4 C	TCLP Pesticides by SW846 1311 8081B, TCLP Herbicides by SW846 1311 8151A, TCLP VOCs by SW846 1311 8260B, TCLP SVOCs by SW846 1311 8270D				N	
✓ 106047IDW2	KAFB10647-SO-106047IDW2-REG	24 MAR 2011	14:16	8 oz CWM	1	None except cool to 4 C	Reactivity, Corrosivity, and Ignitability by SW846 Chapter 7.7.3.4.2				N	
✓ 106047IDW2	KAFB10647-SO-106047IDW2-REG	24 MAR 2011	14:16	4 oz CWM	1	None except cool to 4 C	TPH as Diesel by SW846 8015B, TPH as Gasoline by SW846 8015B, BTEX				N	

## Form C-9. Example Completed Chain-of-Custody Form (concluded)



Shaw E &amp; I, Inc.

1103 932

ANALYSIS REQUEST AND  
CHAIN OF CUSTODY RECORD

Reference Document No: 140705-IDW032

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Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units	File	CID	Condition On Receipt
-2	106047IDW3 KAFB10647-SO-106047IDW3-REG	24 MAR 2011	14:19	4 oz CWM	1 None except cool to 4 C	by SW846 8021 TPH as Diesel by SW846 8015B, TPH as Gasoline by SW846 8015B, BTEX by SW846 8021				N	
-2	106047IDW3 KAFB10647-SO-106047IDW3-REG	24 MAR 2011	14:19	8 oz CWM	1 None except cool to 4 C	TCLP Metals by SW846 1311 6010B, TCLP Mercury by SW846 1311 7470A				N	
-2	106047IDW3 KAFB10647-SO-106047IDW3-REG	24 MAR 2011	14:19	8 oz CWM	1 None except cool to 4 C	Reactivity, Corrosivity, and Ignitability by SW846 Chapter 7.7.3.4.2				N	
-2	106047IDW3 KAFB10647-SO-106047IDW3-REG	24 MAR 2011	14:19	8 oz CWM	1 None except cool to 4 C	TCLP Pesticides by SW846 1311 8081B, TCLP Herbicides by SW846 1311 8151A, TCLP VOCs by SW846 1311 8260B, TCLP SVOCs by SW846 1311 8270D				N	
-3	106081IDW1 KAFB10681-SO-106081IDW1-REG	24 MAR 2011	14:13	8 oz CWM	1 None except cool to 4 C	TCLP Metals by SW846 1311 6010B, TCLP Mercury by SW846 1311 7470A				N	
-3	106081IDW1 KAFB10681-SO-106081IDW1-REG	24 MAR 2011	14:13	8 oz CWM	1 None except cool to 4 C	TCLP Pesticides by SW846 1311 8081B, TCLP Herbicides by SW846 1311 8151A, TCLP VOCs by SW846 1311 8260B, TCLP SVOCs by SW846 1311 8270D				N	
-3	106081IDW1 KAFB10681-SO-106081IDW1-REG	24 MAR 2011	14:13	8 oz CWM	1 None except cool to 4 C	Reactivity, Corrosivity, and Ignitability by SW846 Chapter 7.7.3.4.2				N	
-3	106081IDW1 KAFB10681-SO-106081IDW1-REG	24 MAR 2011	14:13	4 oz CWM	1 None except cool to 4 C	TPH as Diesel by SW846 8015B, TPH as Gasoline by SW846 8015B, BTEX by SW846 8021				N	

## Form C-10. Sample Collection Log

**Sample Collection Log**

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**820017 - Kirtland AFB**

Manager:

RFA / COC Number:

Location Code: **FIELDQC**Task: **140705-ARP2011-GW**Sample Number: **GW8012-AB**Sample Name: **FIELDQC-BW-GW8012-AB-AB**

Collection Date:

Collection Time:

Sampling Method: **NA**

Start Depth:

Sample Type: **BW**Sample Purpose: **AB**

End Depth:

Sampling Equip:

Sample Matrix: **WQ**

QC Partners:

Sample Team:

(TB)

(ER)

(FB)

**Containers**

Analytical Suite

Flt Frtn Qty Size Units Type

SW8260B

N

A

2

40

mL

VOA

VIAL

ERPIMS Values:

Sacode:

Lot Control#:

**Comments:****Sketch Location:**

Logged BY / Date: \_\_\_\_\_

Reviewed BY / Date: \_\_\_\_\_

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